NAVAL STATION NEWPORT
RESTORATION ADVISORY BOARD MEETING
JUNE 19, 2002

MINUTES

On Wednesday, June 19, 2002, the NAVSTA Newport Restoration Advisory Board (RAB) gathered at the Officers' Club for its monthly meeting. The meeting began at 7:02 p.m. and ended at 9:15 p.m.

In attendance were John Vitkevich, Thomas McGrath, Claudette Weissinger, Manuel Marques, Ed Moitza, Susan Hester, Howard Porter, John Lennon, Dr. David Brown, Emmet E. Turley, Thurston Gray, Robert Gilstein, Kelly Woodward, Peter Marnane, Kevin Browley, Greg Kohlweiss (NAVSTA), David D. Dorocz (NAVSTA), Melissa Griffin (NAVSTA), Kathy Marley (NAVSTA), CDR Burnes (NAVSTA), Paul Kulpa (RIDEM), Kymberlee Keckler (USEPA), Steve Parker (TtNUS), Ken Finkelstein (NOAA).

David Dorocz opened the meeting and welcomed the group.

MEETING MINUTES

The March minutes were approved with the following changes: David Brown provided the RAB with an amendment to the minutes to clarify his proposals, see Enclosure (1).

Thurston Gray made a second amendment to the March minutes. The minutes should read March vice April.

OLD BUSINESS

Edward Moitoza suggested there be moderation to the presentations given by the Navy, USEPA, and RIDEM, to allow for a question and answer period after each speaker. Three presentations on the Feasibility Study and Preferred Alternatives followed.

Discussion on Remedial Actions for the Old Firefighting Training Area (OFFTA) - STEVE PARKER

For the Feasibility Study, they evaluated remedial actions to address the sediments as well as the soil. Preliminary Remediation Goals (PRGs) were established, which are the cleanup goals. They identified some complicating factors: the eelgrass, rubble on the shoreline, and a few other problems that might come into play during a dredging scenario. Because of these items, they found a need for additional sediment investigation. Since then, the PRGs have been revised, and will be described in the Feasibility Study.

Steve Parker began with an overview of the Navy's proposal on the Feasibility Study. The plan is to review the findings of investigations and risks, develop remediation objectives, evaluate technologies, develop alternatives for media causing risk and then compare the alternatives. The Record of Decision (ROD) on the Remedial Action is scheduled for next summer and the design and actual construction will be performed after that. After reviewing the calculated risks, the decision on how to clean up the site will be based on remedial objectives. There is a need to evaluate the technologies in place to clean the sediment, soil, and groundwater with consideration to each contaminant. Steve clarified the Evaluation of Technologies step as an evaluation of specific technologies to be used for specific media in the development of an alternative.

Steve discussed the historical view of the OFFTA location, as well as other harbor sources of possible contaminants; specifically, a creek from the mall area, storm drain outfalls, and the Newport Sewage Treatment Plant. There is intertidal and subtidal sediment along the shoreline. Enclosure (2) is a color copy of the Conceptual Site Model. Steve stated that it has been determined that the wind attributes to the water flow more than a standard pattern of circulation.

As part of the Feasibility Study, contact with soil, groundwater, and sediment (intertidal) are included in the Risk Summary.

The Risk Summary addresses adverse health effects to humans or animals at the site and there is elevated risks from drinking the groundwater.

The Risk Summary identifies risk-based values for human exposure to recreation in the intertidal area, risk-based values for exposure to lifetime recreational ingestion of lobsters taken from the site, and toxicity-based values for contaminant exposure to organisms living in the sediment. The cleanup goals are believed to be acceptable for ecological receptors birds, fish, and clams. The results are calculated on actual toxicity measurements made on anthropoids and sea urchins. This is to develop an acceptable concentration for those organisms. The PRGs are based on persons using the property for recreational as well as residential purposes. The state of Rhode Island uses the same exposure limit frequencies for both recreational and residential.

The Remedial Action Objectives are developed from the Preliminary Remediation Goals (PRGs). These objectives are based on why and how to do the remediation. A simple way to explain this is you want to prevent people exposing themselves to the contaminants above safe contaminated levels. In addition the Navy wants to allow an unrestricted use of the property for future recreational and residential use.

The cleanup goals for the groundwater and soil are to prevent exposure to groundwater and soils containing contaminants exceeding the PRGs. For the groundwater it is to prevent exposure to groundwater exceeding federal and state drinking water standards. In the case where contaminants are not regulated by state or federal criteria a safe concentration will then be calculated.

The Sediment Remedial Action Objectives are to prevent human exposure to intertidal sediment exceeding the PRGs. The remedial action for the sediment is to prevent persons from repeatedly eating lobsters and shellfish having absorbed site contaminants, and at a frequency that would give them a health effect, and, to prevent exposure to ecological receptors, clams and mussels, from the contaminants exceeding the PRGs.

The action areas are the groundwater, soil, and sediment areas that exceed the PRGs.

The Conceptual Site Model describes possible soil action areas where concentrations of contaminants are detected above the PRGs. The contaminants are found at different depths and all soils exceed the PRGs at some depth. Steve explained that if we remediate the soil, it would mean removing all the soil and not just a single area.

A reality check of the PRGs is used to make sure what we are developing is actually making sense. For groundwater, there is no need for drinking water at this time, and in addition, the water is known to be brackish. The goal is to allow for an unrestricted use of the property. There are uncertainties in the contaminant transfer from sediment to persons through shellfish ingestion. The model explains a transfer of contaminants from the site into the sediment, from the sediment into the shellfish, and from the shellfish to the person. It is difficult to justify a large cleanup of the sediment based on a model with such uncertainty. The site merits evaluation but there is a need to be sensitive about making an actionable alternative. Protection of ecological receptors is of importance. We want to provide some protection to the environment and not abandon the ecological area, but we do not want to permanently damage the habits present.

An evaluation of the Remedial Alternatives for the three action areas was presented. A description of each alternative is included in the following Enclosures: For soil (see Enclosure (3)); for groundwater (see Enclosure (4)), and, for sediment (see Enclosure (5)).

The Navy's Proposal for each of the action items at the OFFTA was presented (see Enclosure (6)).

Steve Parker concluded his presentation with a more in depth explanation of Enclosures (3), (4), and (5), by comparing the enclosures using Nine Criteria for the evaluation.

Comparison Chart of Soil Alternatives, Enclosure (3):

The Navy Recommends Alternative 3, **Removal and Disposal**, because it meets, all the criteria, except for Criteria 4 - *Reduces mobility, toxicity, and volume through*

treatment. This alternative will move the contaminated material from the site to a landfill, where it is in a controlled environment. Steve added if we were to remove the onshore soil and haul it away and dispose of it off site, the ground would then be restored to its existing elevation.

Comparison Chart of Groundwater Alternatives, Enclosure (4):

The Navy recommends Alternative 2, **Limited Action: Monitoring and Land Use Controls**. Criteria 2 of the Alternative- *Meets Federal and State Standards* uses the word *Potentially* to describe these actions. *Potentially* is used because we do no know for sure that the contaminants will decrease over time after removing the source using these types of technologies, until we actually get there. Alternative 2 meets all the other criteria and allows nature to be the treatment system. Steve added it is very difficult to treat the soil for metals when the metals are partially coming out of the bedrock itself.

Comparison Chart of Sediment Alternatives, Enclosure (5):

There are five Sediment Alternatives. Alternative 2 **Limited Action: Monitoring and Land Use Controls**; Alternative 3 **Limited Removal and Disposal**; and, Alternative 4 **Removal and Disposal Option A,** use the word *Potentially* to describe these actions. Here all of the soil would have to be dug up to meet the Criteria for *Protectiveness*. Alternative 2 has been established to be the Navy's recommended alternative. By restricting access to the shoreline, people will not be exposed to the Sediment at a frequency that would cause a risk. We could then monitor the decrease in contaminants to the sediment over time for the ecological receptors. Every five years a reevaluation of the alternative is necessary to make sure all the goals of the cleanup are met. If the concentrations of the sediment continue to rise, we would have to look at why they are rising.

Questions followed the presentation. Paul Kulpa (RIDEM) asked, How is the sediment getting contaminated? Steve replied that the sediment *is* contaminated and contains contaminates presumably from a number of sources. These sources include the soil at the site from past activities; outside activities input including the storm drains; and, the Bay itself. Steve Parker confirmed that

the thinking is that the OFFTA and past discharges are definitively the cause of the contamination.

Ken Finkelstein (NOAA) asked a question about the outfalls and the Newport Sewer Treatment Plant. The question, How much more contamination is going to be discharged? Steve Parker replied, that it is very likely that the contamination is coming from the historical OFFTA. He further addressed the storm drain outfalls; there are nine acres of area accepting run-off, and spewing the run-off into the harbor regularly. He added most of the area is paved and the runoff may be contributing to the contamination.

Melissa stated that it has been brought up in meetings before that this outfall pipe does run through the site and whether the contamination is coming from the parking lot and going through this pipe, or the pipe is acting to allow contamination from the OFFTA site to enter the bay, cleaning up the site would eliminate the latter possibility.

Steve Parker added since we do not know for sure that the contamination is caused by past activities, or whether it is a continuation of contamination from the outfalls, we are working to identify the contaminants as quickly as possible. We would be removing the soil because of the risk of exposure. There was a question on the fact that we were removing the soil, when it did not directly affect the site sediment. Steve Parker further stated that soil removal would help by eliminating the erosion that in turn would add to the contamination of the sediment; but it is unsure this will rectify the problem of the contaminated sediment.

The risk calculations were addressed as the final question. In simple terms, the risk was calculated for people recreating and ingesting the soil, more than sitting on a park bench. Kymberlee Keckler passed around a sample of 200 mg of white quartz that clarified how much exposure was a risk.

EPA Briefing on the Old Firefighting Training Area (OFFTA) Proposed Remedy Selection Process - KYMBERLEE KECKLER

The next speaker was Kymberlee Keckler (USEPA) regarding the Feasibility Study and How the Alternatives

meet the Nine Criteria. Six reference documents were distributed to the RAB.
1) EPA RI/FS Guidance, 2)The EPA Briefing on the Old Fire Fighting Training Area Proposed Remedy Selection Process, 3)Excerpts from the Ecological Risk Assessment, 4)Summary of EPA comments on the March 2002 OFFTA Feasibility Study, and 5) Why the OFFTA Sediment Monitoring proposal may be inappropriate.

A slide presentation followed, see Enclosure (7).

The main objective of the Feasibility Study is to develop and identify a range of specific cleanup alternatives. We need to evaluate the alternatives according to the nine evaluation criteria. Sometimes this evaluation is completed at the same time as the Remedial Investigation, while, making an assessment of the site risks. There are general categories of alternatives that are looked at, specifically containment, treatment, and recycling.

The feasibility development is the development of remedial objectives, general response actions to address each medium of interest, and to identify volumes of areas where the response action will apply. The EPA RI/FS Guidance of '98 handout (Enclosure (8)) shows an evaluation of criteria threshold factors and basic legal requirements for overall protection of human health and the environmental, to establish how the alternative provides human health and environmental protection. Enclosure (8) also addresses, in detail, the criteria and primary balancing factors associated with the feasibility development.

The evaluation of criteria and modifying considerations for State acceptance and community acceptance will not be until the Proposed Plan stage. The Proposed Plan will go out by the end of the year.

Slides of an aerial view of the OFFTA Fire Training equipment and training structures, with a close-up of the actual Burning Pit were included in the presentation (Enclosure (7)).

The EPA Briefing on the Old Fire Fighting Training Area Proposed Remedy Selection Process of June 19, 2002, discusses an evaluation of alternatives. The soil

alternatives, as viewed by the EPA, were presented. The EPA version of the Comparison Chart is included as enclosure (9). EPA prefers Alternative 2, **Removal, Treatment, and Backfill Alternative** and agrees with Alternative 3, the **Removal and Disposal Alternative** also.

The Sediment Alternatives, as viewed by the EPA followed, (Enclosure (10)). The comparison chart shows the different areas of sediment. Alternative 4, **Removal and Disposal Option A**, and Alternative 5, **Removal and Disposal Option B** are acceptable to EPA. Alternative 4 suggests avoiding the eelgrass; Alternative 5 refers to dredging the area. Kymberlee pointed out that if dredging were to occur, specifically in the eelgrass beds, it would be an impact to the eelgrass. Dredging the eelgrass would be part of the *Short Term Effectiveness* criteria. Only one contaminant in the eelgrass was above the PRGs, and this contaminant is one that degrades over time. Kymberlee added the eelgrass area size is approximately 0.5 of an acre.

The Groundwater Alternatives were not evaluated in the Feasibility Study, this will be forthcoming, but the EPA has a consensus that institutional controls and monitoring is an acceptable remedy for groundwater.

The EPA agrees with the Soil Alternative but does not agree with the Sediment Alternative. The EPA commented on the Sediment Alternatives in the provided handouts and is of the opinion there is enough data to make a decision. There will be some remaining ecological risks as per the excerpts from the Ecological Risk Assessment handout. Most of the alternatives presented for the sediment are not protective as per the EPA Summary Comments. The EPA also feels that the contamination is site related contamination. The OFFTA activities stopped in 1972 and there was an Ecological Risk Assessment performed in 1999. We do not know how long it will take for natural processes to clean up the sediment. The cost of monitoring and postponing a decision needs to be weighed with the cost of monitoring and making a decision now, as well as the idea to go forward with the dredging.

There were no questions after the USEPA presentation.

Paul Kulpa (RIDEM) began his presentation. The State concurs with the EPA on the site. The RIDEM believes the

soil remedy is appropriate, monitoring the groundwater is appropriate, and removal of the sediment is also appropriate at the site.

The pH in the sediment has been previously looked at to determine the possibility that the acidity may be coming from the road runoff. Referencing the parking areas, Paul Kulpa stated that he was happy to hear that Tetra Tech felt that the source was probably the OFFTA.

The State investigated potential sources. They looked at the broken pieces of asphalt, as a potential source, causing the contamination to the sediment. Another possibility was that something was leaching off the asphalt.

TCLP testing is used for landfill monitoring by taking soil, and exposing it to extremely acidic water, to see what dissolves off of the soil. TCLP testing is considered to be a very aggressive way to test.

Many other leaching studies have been performed, using acidic water, on asphalt. The TCLP testing was compared to using plain water for the analysis. The Navy took asphalt samples in 1998.

- Ground-up asphalt mixed with sand was taken from the beach.
- Another sample of asphalt and sand was taken from next to a pile of asphalt on the beach.
- And, a pure sample of just asphalt was also taken from the beach.

The analysis was performed and it was found that the sample next to the pile of asphalt and the sample of sand and asphalt was negative. In the sample that was pure asphalt taken from the beach the analysis showed VOC's in very low concentrations. In estimated values, all the concentrations were below the states Residential Criteria, and all the concentrations were below the Site Specific PRGs developed for this site. In theory, according to State standard the asphalt was safe to be ingested. More samples were taken of just pure asphalt and analyzed; the asphalt did not appear to be contributing to the contamination at the site. The RIDEM agrees with the Navy that the asphalt did not have the same compounds as those in the sediment.

The storm water draining through the site from up gradient may be contributing to the PAHs and contamination on the beach. In 1993, they took a sample from a storm drain immediately up gradient from the site and tested for PAHs. If the concentrations were coming from the parking lot it should have PAHs in it without being flushed out. Only contaminants associated with plastics were found. In 1998, the Navy resampled the same storm drain and found no contaminants from water draining from the parking lot, comparable to those in the sediment. One other thing was looked at, as storm water impacts are of concern, compounds coming from them; such as copper, cadmium and zinc are associated with parking lots, streets, and brake lines. When the state looked at the concentration of these metals from the water coming from these outfalls, it was expected that they would be high, but they were found to be low. It was thought that the storm water did not significantly contribute to the contamination of the site, as indicated in the Navy's report of 1998.

The RIDEM agrees with the Navy that historical practices have caused the sediment adjacent to the site to be contaminated.

We have to look at how the sediment is going to remediate itself overtime if we do something as opposed to doing nothing. It seems the pH is more related to the marine environment as opposed to the land. Since no other source was found to be an impact, the RIDEM feels that the sediments should be dug up and removed.

Steve Parker of Tetra Tech stated that the Navy's proposal for the OFFTA area is to remove and remediate the soil; and monitor the sediment. He questioned Paul Kulpa referencing the leaching study performed on water, using the TCLP analysis. He clarified that the Navy agreed that the oils of the asphalt do not wash off under normal conditions, and then remain in the water. The storm drain samples taken from the parking lot areas in 1993 and 1998 were water samples. He stated the storm water is a source to the contaminants in the harbor. He further clarified the sediment at the discharge point is probably being affected by the silts and particles being carried with the water from the parking lot, as well as the water itself.

Paul Kulpa referred to the groundwater at the site. The Navy compared the groundwater to the sediments at the site. The concentrations of PAHs and types of material found in the groundwater does not compare to what was found in the sediment on the beach. This was addressed in the Navy's Draft Feasibility Study. The groundwater was not a significant contributor to the contamination on the beach.

Kymberlee Keckler of the EPA commented on the decision making process, she stated that all three agencies need to agree before they go to the next step, the proposed remedy and Proposed Plan. The EPA Briefing Handout is a summary of reports that go back to 1991. She cautioned, the RAB needs to be familiar with this information while making a decision.

Dr. David Brown suggested organizing a follow-up subcommittee meeting to discuss their views on the sediment and the preferred plan. He also added that, at one point, the committee could address questions that may be on the publics mind, during the decision making process. John Vitkevich stated he supports this idea.

NEW BUSINESS

David Dorocz announced, Mr. David Sanders has resigned from the NSN Public Affairs Office, and will be working for Congressman Kennedy. Mary Silvia is presently the acting Public Affairs Officer.

COMMITTEE REPORTS

The Restoration Advisory Board forwarded their comments on the June 19, 2002 minutes, as a Project Committee Report, for inclusion as updated. Enclosure (11) is a summary of the Dredging Operations and Environmental Research (DOER) Program.

MEMBERSHIP COMMITTEE

Thurston Gray welcomed members of the community to the RAB. He hopes they find that the RAB is motivating and informative. Kelly Woodward, AICP Coordinator, Robert Gilstein, Portsmouth Town Planner and, David Peterson, EPA Site Attorney were among those introduced.

Thurston Gray participated in an eelgrass transplant project for Save the Bay. The project took six days at Kings Beach and Fort Getty using divers to pick up the plants, by thinning the healthy areas. They planted the eelgrass at three different locations, using the Save the Bay training vessels. 6,400 eelgrass plants at each site were planted by 121 volunteers. The cost was estimated at $20,000. The TERF technique was used by tieing the plants with twisted paper. John Vitkevich asked, when we would see the results of the project. Thurston Gray stated that they would be monitoring the eelgrass transplants through the summer.

PUBLIC INFORMATION COMMITTEE

The Public Information Committee urged that public notices of RAB meetings be put into the calendar listings of local newspapers.

Dr. David Brown would like to see follow-up discussions with the RAB Members to analyze options, and key dimensions of the Proposed Plan, for emphasis in future information materials.

PLANNING COMMITTEE

Thomas McGrath stated that the committee is interested in the result of the site remediation project, and would like to see the same format used for the Gould Island Project.

There was a request by the committee to see the OFFTA and the shipyard area where the Providence Gas Facility is located, as well as the Tank Farm Area.

EDUCATION COMMITTEE

No report as committee chair was not present.

Tank Farm Proposal - DAVID DOROCZ, NAVSTA

The Navy is moving forward with the planning to build an 18-hole golf course at Tank Farms 2, 3 and 4 in 2005. Additionally, the Navy is accelerating the cleanup plans for the sites in order to complete the cleanup by September 2004.

The Navy will perform an Environmental Assessment under the National Environmental Policy Act (NEPA) in order to fully evaluate all environmental impacts. The Navy is also looking at constructing walking trails around the golf course, for use by the Public. Public Hearings will be held, as part of the NEPA process, in order for the community and stakeholders to learn more about the project and to provide comments. The proposed plan is for an 18-hole golf course, for use by military and DOD civilian workers. The Naval Station Commanding Officer would like the golf course to be a state of the art environmental golf course, with wildlife corridors and use Integrated Pest Management practices. The planning of the golf course project will help in moving forward with the cleanup process of the Tank Farms, as the Navy was originally scheduled to begin studying the sites in 2004, and, complete the cleanup process in 2012.

John Vitkevich asked about the funding money for the Tank Farm golf course project and would it affect CERCLA and UST Removal Project fundings. Melissa Griffin stated that additional funding will be granted for the project. The current schedule and funding for other sites will not be impacted.

Robert Gilstein (Portsmouth Town Planner) talked about the tank farms, public property, and zoning. The Town of Portsmouth has zoned Tank Farms 3 and 4 as open space, and most of Tank Farms 1 and 2 as light industry. The more down hill parts of Tank Farms 1 and 2 are considered the Marine Trade District, as they are associated with Melville. This area has a real potential for doubling in size. The Town does not have any objections, at this time, to the building of the golf course, but the Town does have concerns with regard to Tank Farm 1. The Town would like the Navy to consider including Tank Farm 1 in their plan so it would also be clean by September 2004. The Town would be considering this a future economic engine and does not want Tank Farm 1 to be left out.

Kelly Woodward (Aquidneck Island Planning Commission) discussed the Commission's view on the Golf Course Project. The Commission has not taken an official position on any plans for the area only because they are presently developing a master plan for the entire West Side area. Kelly expressed her appreciation for the Navy, taking the opportunity to meet with the Community. When the commission reviewed the plans and comments up-to-date, for

the use of the property, the Commission's view is to support this on-going planning process. Dave Dorocz stated they would be moving forward with the project planning with the hope of coordinating these plans at Public Meetings.

NEXT MEETING

The next meeting of the Restoration Advisory Board (RAB) is scheduled for Wednesday, July 17, 2002 at 7:00 p.m., at the Officers' Club.

The meeting was adjourned at 9:15 p.m.

Enclosures:
(1) Amendment to the March 17, 2002 NSN Minutes
(2) Color Copy of the Conceptual Site Model
(3) Comparison Chart of Soil Alternatives
(4) Comparison Chart of Groundwater Alternatives
(5) Comparison Chart of the Sediment Alternatives
(6) Slides from the OFFTA Discussion of Remedial Actions
(7) Slides from the EPA Briefing on the OFFTA Proposed Remedy Selection Process
(8) EPA RI/FS Guidance of October 98
(9) EPAs version of the Comparison Chart for Soil
(10) EPAs version of the Comparison Chart for Sediment
(11) Summary of the Dredging Operations and Environmental Research (DOER) Program

Amendments requested by Dave Brown
To the April 17, 2002 NSN RAB minutes

P. 4, para. 3 "Dr. Brown expressed concerns...."
This paragraph doesn't capture what I thought I was saying. Please replace with the following:

Thinking especially of the upcoming OFFTA cleanup and the previous Katy Field emotions, Dr. Brown expressed the view that, before issuing public information briefs, it will be important that the Navy work with the RAB and its Information Committee in developing the releases. This will help insure that key questions on citizens' minds are addressed in a way that is meaningful and understandable to them. Citizen RAB participation in the releases will also help to legitimate the information.

P. 5, Public Information Committee, para. 2 "The next item discussed..."
Not quite what happened. Please replace with the following:

The next item discussed was the refined prototype of the advertisement that appears in the newspaper each month. Dave Brown entertained comments. Some liked the proposed content and style, but wanted a different font. Greg Kohlweiss said he preferred being consistent with customary Navy style—variations of one standard font and centered text. Dr. Brown said that he would send to Melissa Griffin one or more refined prototypes that seek to reflect the suggestions. He stressed that what is important is content and style which "turns on" the citizen groups we're trying to reach. He suggested that Melissa and her associates experiment with some variations and we can see which generates the best response.

Dr. Abbass asked who has final authority to approve the ad. Dave Dorocz said that he does, because he authorizes expenditures for the RAB and some Navy policies have to be honored. Dave Brown said this may be true, but it would be good practice for the Navy people fully to discuss their ideas and constraints about ads, site press releases, etc. in the open forums of the RAB, rather than deciding on their own in isolation afterwards.

A few members urged that public notices of RAB meetings be put in the calendar listings of local newspapers also.

Enclosure 1

Enclosure 3

COMPARISON OF SOIL ALTERNATIVES

The Nine Criteria for Selecting a Cleanup Remedy	Alt. 1 No Action	Alt. 2 Removal, Ex Situ Treatment, Backfill	Alt. 3** Removal and Disposal
1 - Protects human health and the environment	NO	YES	YES
2 - Meets federal and state standards	NO	YES	YES
3 - Provides long-term effectiveness and permanence	NO	YES	YES
4 - Reduces mobility, toxicity, and volume through treatment	NO	YES	NO
5 - Provides protection from short-term impacts	NA	YES	YES
6 - Implementable (can it be done?)	YES	YES	YES
7 – Cost (estimated)	$70,000	$12 m	$8.1 m
8 - RIDEM acceptance	To be determined after the public comment period		
9 - Community acceptance	To be determined after the public comment period		
Time to achieve cleanup goal	Not Achieved	6-8 months	4-6 months

YES = Meets criterion; NO = Does not meet criterion; PARTIALLY = Partially meets criterion; POTENTIALLY = May meet criterion; NA = Not applicable

**This is the Navys preferred remedy for the soil.

Enclosure 4

COMPARISON OF GROUNDWATER ALTERNATIVES

The Nine Criteria for Selecting a Cleanup Remedy	Alt. 1 No Action	Alt 2** Limited Action: Monitoring and Land Use Controls	Alt 3 Active Remediation: Pump and Treat Groundwater
1 - Protects human health and the environment	NO	YES	YES
2 - Meets federal and state standards	NO	POTENTIALLY	POTENTIALLY
3 - Provides long-term effectiveness and permanence	NO	YES	NO
4 - Reduces mobility, toxicity, and volume through treatment	NO	NO	YES
5 - Provides protection from short-term impacts	NA	YES	YES
6 - Implementable (can it be done?)	YES	YES	YES
7 – Cost (estimated)	$70,000	*~$500,000*	*$5-10M*
8 - RIDEM acceptance	To be determined after the public comment period		
9 - Community acceptance	To be determined after the public comment period		
Time to achieve cleanup goal	Not Achieved	Approx 5 Years	Approx 20 Years

YES = Meets criterion; NO = Does not meet criterion; PARTIALLY = Partially meets criterion; POTENTIALLY = May meet criterion; NA = Not applicable

**This is the Navys preferred remedy for the Groundwater.

Enclosure 5

COMPARISON OF SEDIMENT ALTERNATIVES

The Nine Criteria for Selecting a Cleanup Remedy	Alt. 1 No Action	Alt. 2** Limited Action: Monitoring and Land Use Controls	Alt 3. Limited Removal and Disposal	Alt. 4 Removal and Disposal Option A	Alt. 5 Removal and Disposal Option B
1 - Protects human health and the environment	NO	POTENTIALLY	POTENTIALLY	POTENTIALLY	YES
2 - Meets federal and state standards	NO	POTENTIALLY	POTENTIALLY	POTENTIALLY	YES
3 - Provides long-term effectiveness and permanence	NO	POTENTIALLY	POTENTIALLY	POTENTIALLY	YES
4 - Reduces mobility, toxicity, and volume through treatment	NO	NO	NO	NO	NO
5 - Provides protection from short-term impacts	NA	YES	PARTIALLY	PARTIALLY	NO
6 - Implementable (can it be done?)	YES	YES	YES	YES	YES
7 - Cost	$70,000	$517,000	$3.4 M	$3.8 M	$3.7 M
8 - RIDEM acceptance	To be determined after the public comment period				
9 - Community acceptance	To be determined after the public comment period				
Time to achieve cleanup goal	Not Achieved	1-5 years	3-4 months	6-8 Months	6-8 Months

YES = Meets criterion; NO = Does not meet criterion; PARTIALLY = Partially meets criterion; POTENTIALLY = May meet criterion; NA = Not applicable

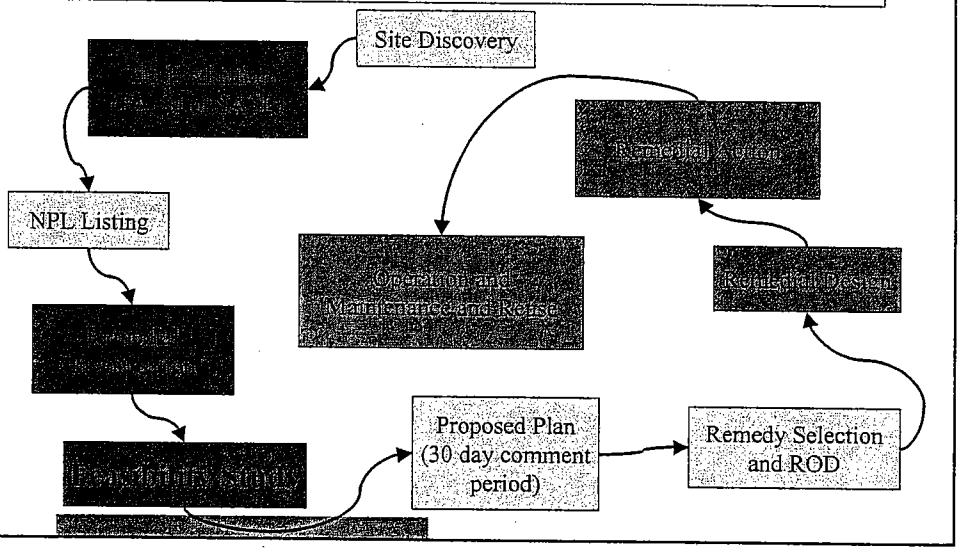
**This is the Navys preferred remedy for the sediment.

Old Firefighting Training Area

Discussion of Remedial Actions

Tetra Tech NUS Inc.

The CERCLA Process



Feasibility Study

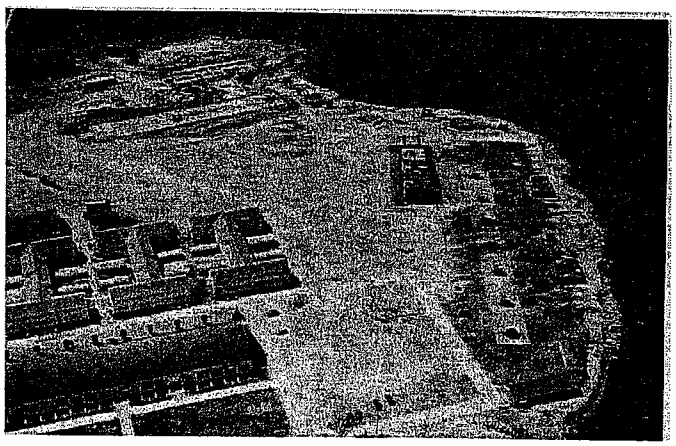
Overview

- Review findings of Investigations & Risks
- Develop Remediation Objectives
- Evaluate Technologies
- Develop alternatives for media causing risk
- Compare alternatives

Conceptual Site Model:

Historical View

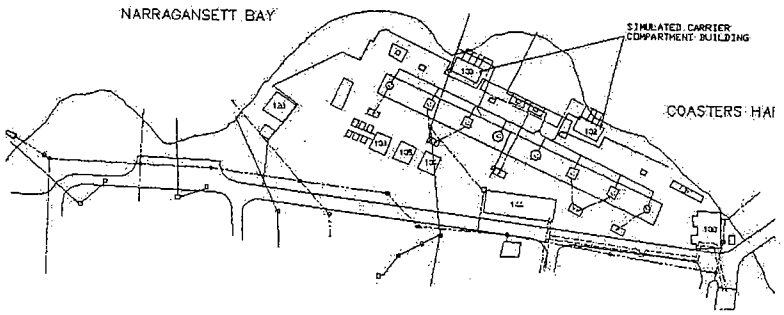
- Fire Training Area from 1940s to 1972
- Air Photo 1940s



Conceptual Site Model:

Historical View

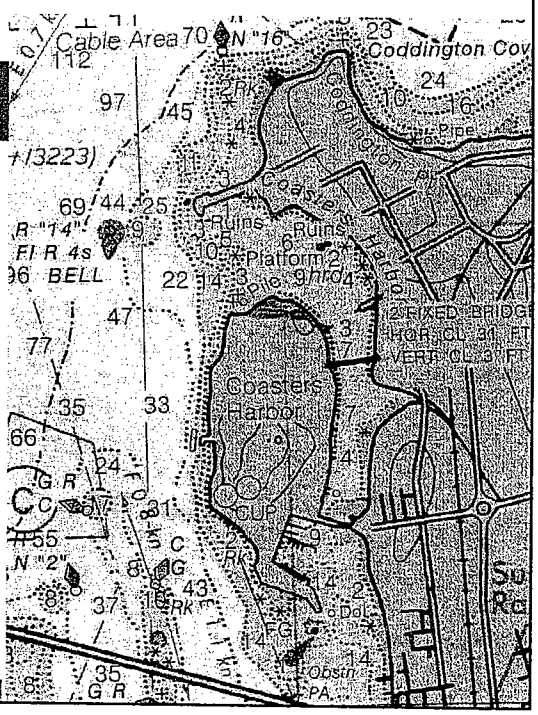
- **Oil from burn pits drained to Coasters Harbor**



OFFTA

Location

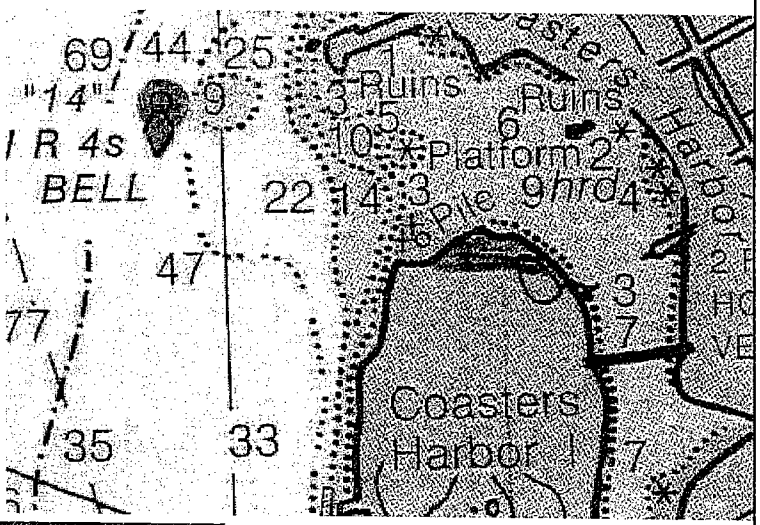
- **Harbor open at North and south**
- **Water flows in and out both ends (no overall flow) - Wind driven currents predominate**
- **Contaminant inputs from**
  - **outfalls**
  - **creek**
  - **marinas**
  - **Newport sewer outfall**



OFFTA

Location

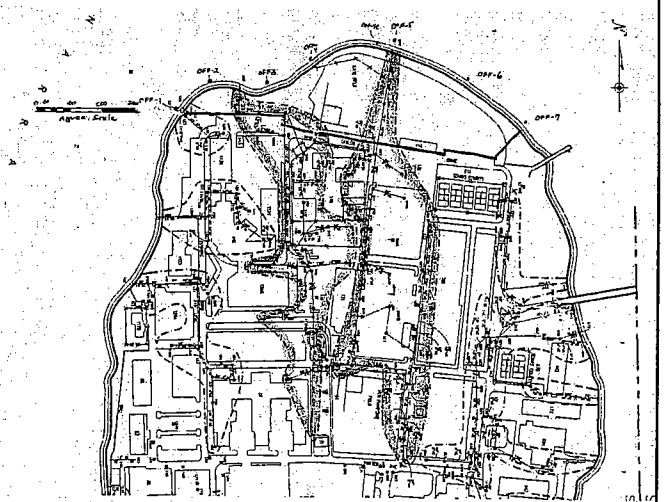
- **North end of Coasters Harbor Island**
- **Light boat traffic**
- **Depth is 0-12 feet**



Conceptual Site Model:

Surface Runoff

- Two Primary Outfalls
- Blue = 3.5 acres
- Green = 5.4 acres



Conceptual Site Model:

Current Conditions

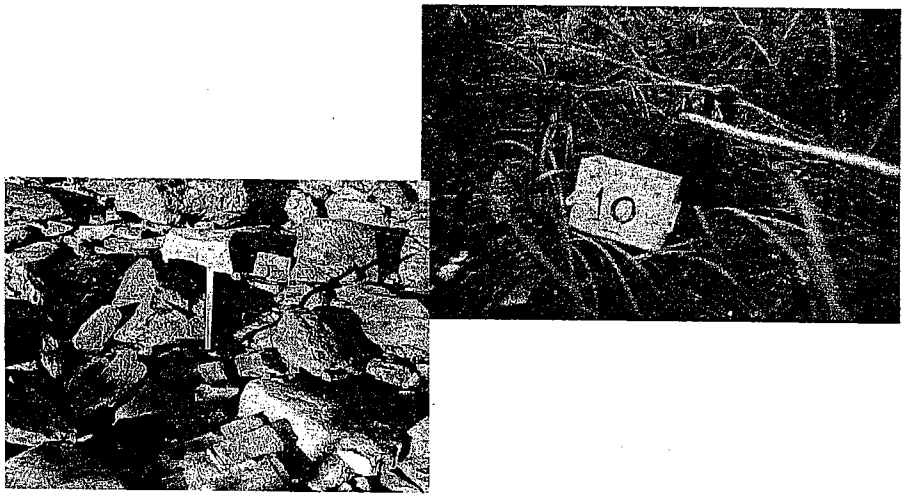
- Site reopened in 1976 as a park and ballfield
- Site closed and fenced in 1998

Current Conditions

Shoreline (Beach)

Current Conditions

Intertidal and Subtidal Sediment



Feasibility Study

Risk Summary

- SOIL -
  - **Risk from contact with soil by persons using the property for recreational/residential purposes**
- GROUNDWATER
  - **Risk from drinking groundwater**
- SEDIMENT
  - **Risk from contact with sediment (intertidal)**
  - **Risk from eating shellfish**
  - **Risk to ecological receptors**

Soil

Preliminary Remediation Goals

- RIDEM Direct Exposure Criteria for Residential soil
- Risk Based levels for exposure to soils
  - Residential Land Use
  - Recreational Land Use

Soil

Remedial Action Objectives

- Prevent exposure to soils containing contaminants exceeding PRGs
- Allow unrestricted re-use of the property.

Groundwater

Preliminary Remediation Goals

- Maximum Contaminant Levels (State and Federal)
- Risk Based Levels for drinking water

Groundwater

Remedial Action Objectives

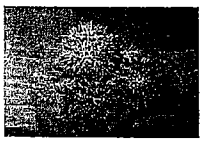
- Prevent exposure to groundwater exceeding drinking water standards

- Allow unrestricted re-use of the property

Sediment

Preliminary Remediation Goals

- Risk-based values for human exposure to recreation in the intertidal area.
- Risk-based values for exposure to lifetime recreational ingestion of lobsters taken from the site.
- Toxicity-based values for contaminant exposure to organisms living in the sediment.



Sediment

Remedial Action Objectives

- Prevent human exposure to intertidal sediment exceeding PRGs
- Prevent persons from repeatedly eating lobsters or shellfish that has absorbed site contaminants
- Prevent exposure to ecological receptors from contaminants exceeding PRGs

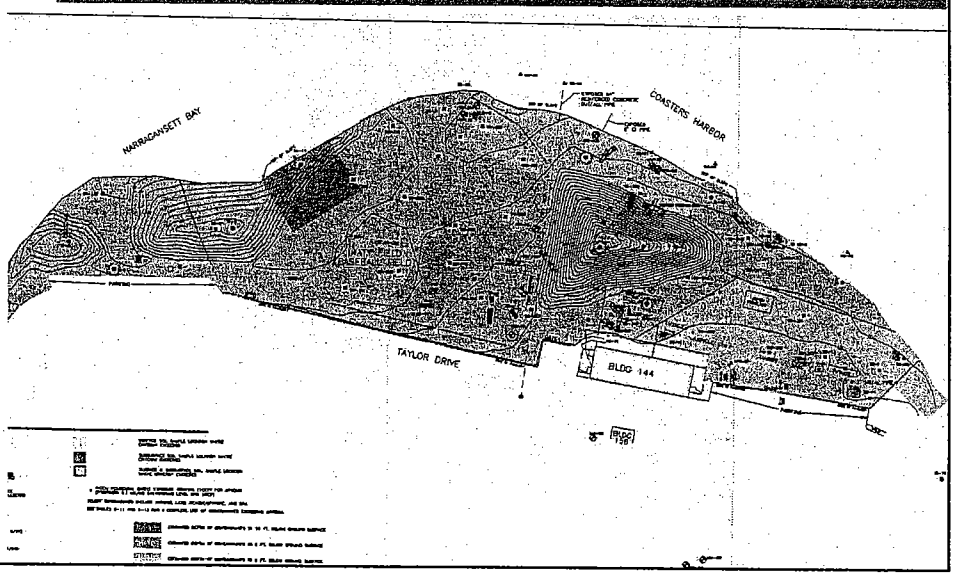
Feasibility Study

Action Areas

- Soil exceeds PRGs for recreational/ residential use of the land
- Groundwater exceeds PRGs for drinking water.
- Iintertidal sediment exceeds PRGs for recreational/residential use of the beach.
- Some intertidal and subtidal sediment exceeds PRGs for ecological receptors.

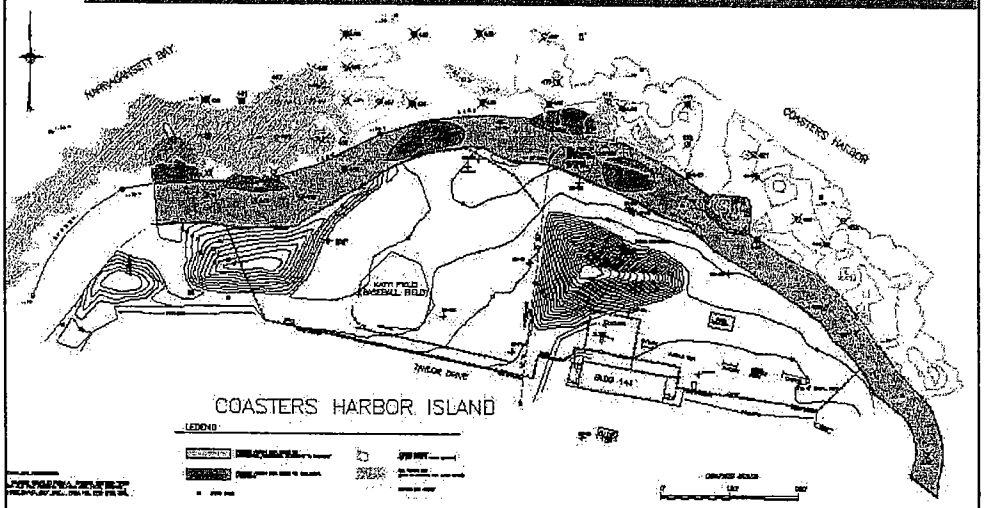
Remedial Alternatives

Possible Soil Action Areas



Remedial Alternatives

Possible Sediment Action Areas



Preliminary Remediation Goals

Reality Check

- No groundwater production wells at the site. Currently a GB aquifer and brackish water
  - **Don't need immediate groundwater use.**
- Uncertainties in the contaminant transfer from sediment to persons through shellfish ingestion
  - **Cant justify large cleanup with such uncertainty**
- Protect ecological receptors
  - **But don't permanently damage habitats present.**

Remedial Alternatives

Onshore Soil

1. No Action
2. Removal, Treatment and Backfill
3. Removal and Disposal

Remedial Alternatives

Groundwater

1. No Action
2. Land Use Controls and Monitoring
3. Active Remediation (extraction and treatment)

Remedial Alternatives

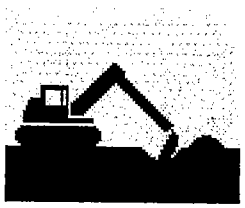
Sediment

1. No Action
2. Limited Action (restrict beach access and monitor exposures to ecological receptors)
3. Limited Removal and Disposal (removal at beach area with offshore area monitoring)
4. Removal and Disposal Option A (beach and offshore area, excluding eelgrass area)
5. Removal and Disposal Option B (beach and offshore area including eelgrass area

Navy Proposal

Soils

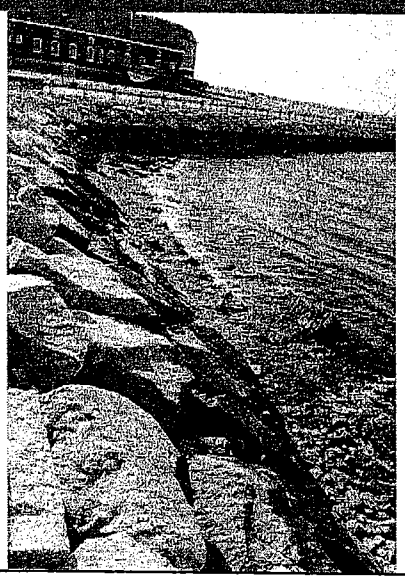
- Excavate soils and rubble
- Horizontal extent to high tide line
- Dispose soils and rubble offsite



Soil Removal

Shoreline Protection

- Native or imported stone
- Install as needed to protect soil from erosion
- provides somewhat natural habitat substrate



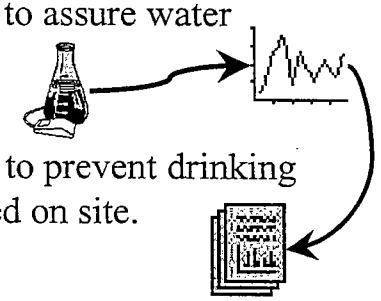
Soil Removal

Shoreline Protection

Navy Proposal

Groundwater

- Remove the source of the contamination (soil)
  - **Groundwater will stop absorbing contaminants**
- Monitor the groundwater to assure cleanup goals will eventually be reached and to assure water quality is not further degraded.



- Establish a land use restriction to prevent drinking water wells from being installed on site.

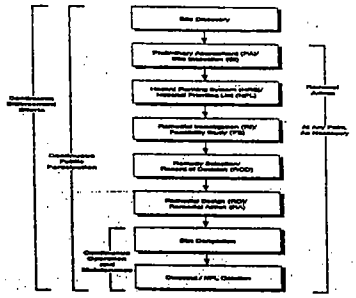
Navy Proposal

Sediment

- Remove one suspected source of contamination (soils)
- Monitor sediment quality to see if cleanup goals will eventually be reached.

- Restrict access to the intertidal area from recreation (fencing and signs)
- No additional shellfishing restrictions

CERCLA Process



EPA

Feasibility Study

- Development and analysis of a range of specific cleanup alternative, according to the nine evaluation criteria
- Often done concomitant with or after the Remedial Investigation
- Most Cleanup Alternatives can be categorized into four general areas: Treatment, Removal, Recycling, Containment

EPA

Feasibility Study Development

- Develop Remedial Action Objectives & Preliminary Remediation Goals
- Develop general response actions (including combinations) for each medium of interest
- Identify volumes of areas where the response action will apply
- Present relevant information about alternatives to allow selection of a remedy

EPA

Evaluation Criteria Threshold Factors

- Overall Protection of Human Health and the Environment
- Compliance with ARARs (substantive environmental requirements and facility siting laws)

EPA

Evaluation Criteria Primary Balancing Factors

- Long-term Effectiveness and Permanence
- Reduction of Toxicity, Mobility, or Volume through Treatment
- Short-term Effectiveness
- Implementability
- Cost

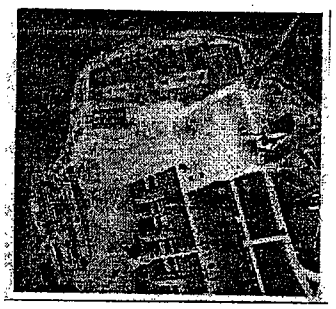
EPA

Evaluation Criteria Modifying Considerations

- State Acceptance
- Community Acceptance

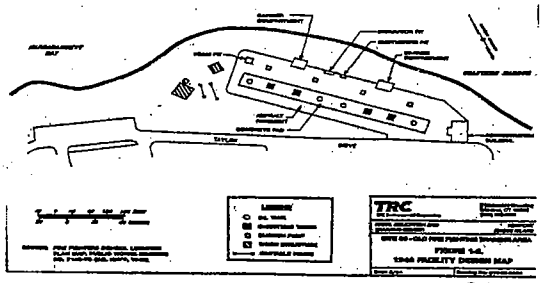
EPA

OFFTA Aerial of Fire Training Equipment



EPA

OFFTA Fire Training Structures



EPA

Close-up of OFFTA Burning Pit

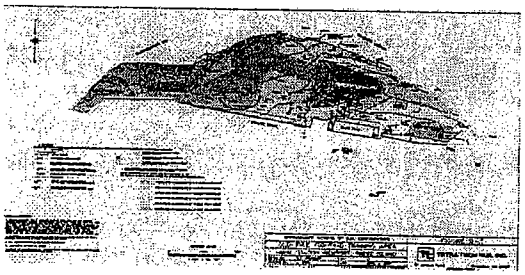
EPA

OFFTA Soil Alternatives

	No Action	Removal, Ex Situ treatment, & Backfill	Removal & Disposal
Overall Protection of Human Health & the Environment	Not productive	Protective	Protective
Compliance with ARARs	Will not meet ARARs	Meets ARARs	Meets ARARs
Long-term Effectiveness and Permanence	Not effective over the long-term	Most effective over the long-term	Effective over the long-term
Reduction of Toxicity, Mobility, or Volume through Treatment	No treatment	Meets this criterion by treating all contaminated soils	No treatment
Short-term Effectiveness	Not effective over the short-term	6 to 8 months	Fugitive dust may be controlled with dilution; 4 to 6 months
Implementability	Easy to implement	Most difficult to implement, but possible	Possible to implement
Cost	$70,000	$11,957,000	$8,105,000

EPA

OFFTA Soil Excavation Areas



EPA

OFFTA Soil Alternative EPA's Preferred Option

- Alternatives 2 and 3 are acceptable to EPA – Alternative 2 is preferred over Alternative 3

EPA

OFFTA Sediment Alternatives

	No Action	Access Restrictions & Long-term Monitoring	Limited Removal & Disposal (Beach Area)	Removal & Disposal (Option A)	Removal & Disposal (Option B)
Overall Protection of Human Health & the Environment	Not protective	Not protective of the environment	Not protective of the environment	Protective	Protective
Compliance with ARARs	Will not meet ARARs	Will not meet ARARs	Meets ARARs	Meets ARARs	Meets ARARs
Long-term Effectiveness and Permanence	Not effective over the long-term	Not effective over the long-term	May be effective over the long-term	Effective over the long-term	Effective over the long-term
Reduction of Tox., Mob., or Vol. through Treat.	No treatment	No treatment	No treatment	No treatment	No treatment
Short-term Effectiveness	Not effective over the short-term	Length of time for MNR wasn't estimated; 1 month to install fence	Turbidity caused by dredging may be controlled with silt curtains; 3 to 4 months	Turbidity caused by dredging may be controlled with silt curtains; 6 to 8 months	Dredging may cause more harm than good; 6 to 8 months
Implementability	Easy to implement	Easy to implement	Possible to implement	Possible to implement	Most difficult to implement, but possible
Cost	$70,000	$517,000	$3,372,000	$3,826,000	$3,772,000

EPA

OFFTA Sediment Dredging Areas

EPA

OFFTA Sediment Alternatives
EPA's Preferred Option

- Alternatives 4 and 5 are acceptable to EPA – Alternative 4 is preferred over Alternative 5

EPA

OFFTA Feasibility Study
Summary of EPA comments

- The Navy's proposal to install a fence to isolate the offshore area is not protective of the marine environment
- Groundwater needs to be evaluated as a separate medium of concern (issue raised in June 2001)
- The lines drawn on the maps do not appear to be supported by data
- Most of the alternatives presented for sediment are not protective
- The cost estimates do not include many "hidden" costs (*e.g.*, ensuring the Coasters Harbor Island bridge can withstand the truck traffic)

EPA

OFFTA Feasibility Study
Summary of EPA comments

- There is no estimate of how long it would take for sediment concentrations to naturally recover to PRG levels
- Rationale for applying different sediment PRGs to different sediment areas is not explained well
- Costs associated with eelgrass restoration may have been underestimated
- For the sediment alternatives, the least environmentally damaging practicable alternative should be identified
- Risks associated with dioxin exposure should be updated

EPA

OFFTA Feasibility Study
Summary of EPA comments

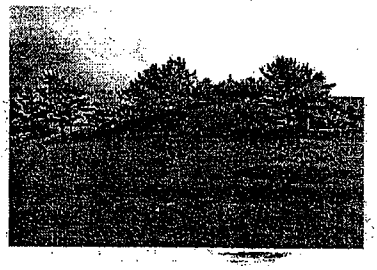
- Need to ensure that subsurface oil piping is removed
- Clarify that removing "vadose zone soil" means removing all of the soil from the surface down to and including the vadose zone
- Numerous inconsistencies throughout the report - Tables, figures, and text do not conform
- Need to present risk from background contaminants
- Risks from shellfish ingestion are not addressed by alternatives (*Note:* Oysters were abundant offshore)
- Total Petroleum Hydrocarbons are excluded from CERCLA

EPA

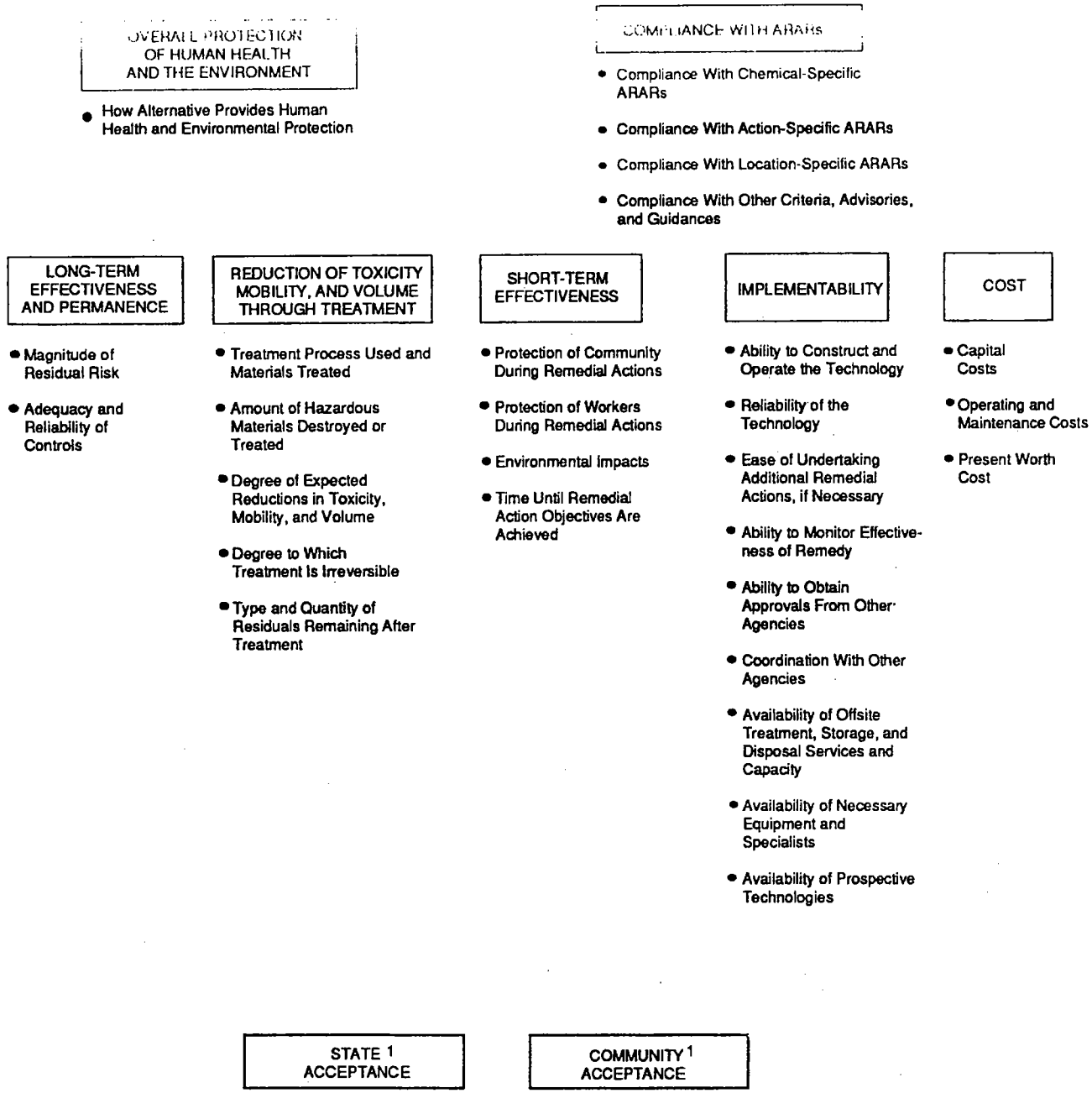
OFFTA – Debris along shoreline

EPA

OFFTA – Central Drumlin



EPA



[1] These criteria are assessed following comment on the RI/FS report and the proposed plan.

Figure 6-2. Criteria for detailed analysis of alternatives.

The following should be addressed for each alternative during the detailed analysis of ARARs:[5]

- Compliance with chemical-specific ARARs (e.g., maximum contaminant levels) – This factor addresses whether the ARARs can be met, and if not, whether a waiver is appropriate.
- Compliance with location-specific ARARs (e.g., preservation of historic sites) – As with other ARAR-related factors, this involves a

[5] Other available information that is not an ARAR (e.g., advisories, criteria, and guidance) may be considered in the analysis if it helps to ensure protectiveness or is otherwise appropriate for use in a specific alternative. These TBC materials should be included in the detailed analysis if the lead and support agencies agree that their inclusion is appropriate.

Table 6: Detailed comparison of Soil Alternatives

	No Action	Removal, Ex Situ treatment, & Backfill	Removal & Disposal
Overall Protection of Human Health & the Environment	Not protective	Protective	Protective
Compliance with ARARs	Will not meet ARARs	Meets ARARs	Meets ARARs
Long-term Effectiveness and Permanence	Not effective over the long-term	Most effective over the long-term	Effective over the long-term
Reduction of Toxicity, Mobility, or Volume through Treatment	No treatment	Meets this criterion by treating all contaminated soils	No treatment
Short-term Effectiveness	Not effective over the short-term	6 to 8 months	Fugitive dust may be controlled with water; 4 to 6 months
Implementability	Easy to implement	Most difficult to implement, but possible	Possible to implement
Cost	$70,000	$11,957,000	$8,105,000

Table 7: Detailed comparison of Sediment Alternatives

	No Action	Limited Action	Limited Removal & Disposal (Beach Area)	Removal & Disposal - Option A	Removal & Disposal - Option B
Overall Protection of Human Health & the Environment	Not protective	Not protective of the environment	Not protective of the environment	Protective	Protective
Compliance with ARARs	Will not meet ARARs	Will not meet ARARs	Meets ARARs	Meets ARARs	Meets ARARs
Long-term Effectiveness and Permanence	Not effective over the long-term	Not effective over the long-term	May be effective over the long-term	Effective over the long-term	Effective over the long-term
Reduction of Toxicity, Mobility, or Volume through Treatment	No treatment	No treatment	No treatment	No treatment	No treatment
Short-term Effectiveness	Not effective over the short-term	Length of time for natural recovery was not estimated; 1 month to install fence	Turbidity caused by dredging may be controlled with silt curtains; 3 to 4 months	Turbidity caused by dredging may be controlled with silt curtains; 6 to 8 months	Dredging of eelgrass bed may cause more harm than good; 6 to 8 months
Implementability	Easy to implement	Easy to implement	Possible to implement	Possible to implement	Most difficult to implement, but possible
Cost	$70,000	$517,000	$3,372,000	$3,826,000	$3,772,000

Newport Restoration Advisory Board
Project Committee Report
June 19, 2002

Dredging operations to support economic waterway transportation and environmental requirements of navigation projects are inseparable. The U.S. Army Corps of Engineers have been assigned this overwhelming and ongoing task.

It has long been recognized that Research and Development are an important component of their dredging program. In the 1970's the research focused on the understanding of ecological impacts of dredged material disposal, and the evaluating and managing of sediments.

By the 1980's the focus was on reducing costs of dredging, improving dredging operations, and increasing project management efficiency. During the 1990's and now in the 21st century, environmental protection is top issue, while facing decreasing fiscal and manpower resources.

In response to this challenge, USACE created the "DOER Program", Dredging Operations and Environmental Research Program, to focus on six areas of importance for safe and cost effective dredging techniques. This article enclosed explains this program, and the six focus areas.

They are: (1) Nearshore and Offshore Placement of Dredged Material;(2) Environmental Windows for Dredging Operations; (3) Contaminated Sediment Characterization and Management; (4) Instrumentation for Dredged and Site Monitoring: (5) Demonstration of Innovative Equipment and Process Technologies; and (6) Ecological Risk Management for Dredging and Disposal Projects.

It is hoped that this article will help many of these research proposals to become familiar within the restoration plan this group has to address.

Submitted by:

Emmet E. Turley

Emmet E. Turley, Chairperson

Enclosure (11)

Dredging Operations and Environmental Research (DOER) Program

E. Clark McNair, Jr.
Operational Program Manager
U.S. Army Engineer Waterways Experiment Station
Coastal and Hydraulics Laboratory
Vicksburg, MS

Background

Waterway transportation is the most economical means for moving national and international commerce. Protection and enhancement of the environment associated with U. S. waterway infrastructure operation and maintenance is a national priority. The U.S. Army Corps of Engineers (USACE) is faced with the challenge of maintaining a viable navigation system through dredging while providing environmental protection to the nation's resources. Thus, dredging operations and environmental requirements of navigation projects are inseparable. Dredging costs to maintain viable navigation, now in excess of $500 million annually, are increasing. These costs are borne by the dredging projects and are exacerbated by Federal and state agencies charged with assuring environmental sustainment.

Research and development is an integral component of managing the USACE dredging program. Dredging research in the 1970's focused on understanding ecological impacts of dredged material disposal, and on evaluating and managing sediments. In the 1980's, research focused on reducing costs of dredging, improving dredging operations, and increasing project management efficiency. Accomplishing the navigation dredging mission while balancing

environmental protection is the major challenge of the 1990's and into the 21st century. Integration of operational and environmental aspects of dredging and disposal must be accomplished within a climate of increased dredging workload need and environmental constraints with decreasing fiscal and manpower resources. Objectives of the USACE Dredging Operations and Environmental Research (DOER) Program are to develop technologies, methodologies, and techniques to assure that the operational and environmental issues of the USACE dredging program are adequately and efficiently met.

The DOER Program

The concept of the DOER Program emerged as a result of technology deficiencies identified during execution of the recently completed USACE Dredging Research Program, but were unaddressed due to program limitations. The DOER Program was formulated toward addressing these documented deficiencies of the primary Corps users (field operating Division and District offices). The problems identified by the field offices were categorized into six specific applied research focus areas each with work tasks describing objectives, research methodologies, user products, and time/cost schedules. The USACE Directorate of Research and Development delegated primary responsibility for executing the DOER Program to the U.S. Army Engineer Waterways Experiment Station (WES), with research being performed by the WES Coastal and Hydraulics Laboratory (CHL), Environmental Laboratory (EL), and Geotechnical Laboratory. The 8-year, $48-million DOER Program was initiated in October 1996, and is scheduled for completion at the end of September 2004. The DOER executive program manager is Dr. Robert Engler, WES EL, englerr@ex1.wes.army.mil. DOER operational program manager is Mr. Clark McNair, WES CHL, mcnairc@ex1.wes.army.mil.

The DOER Program will investigate dredging issues in six focus areas.

1. **Nearshore and Offshore Placement of Dredged**

Material will predict the time- dependent movement of noncontaminated sand and sand/silt mixture of dredged materials placed in the nearshore zone, and all materials placed in the offshore region.

Nearshore (<30 ft) and offshore (>30 ft) locations present a variety of challenges and opportunities for the cost-effective environmentally acceptable placement of dredged material. In addition to being very costly, conventional disposal practices usually remove the sandy and silty materials that build and maintain beaches and barrier islands. Regarding contaminated dredged material, the demand for offshore capping will increase as upland and other traditional options become more and more scarce. Open-water placement options for contaminated and non- contaminated materials are presently constrained by a lack of predictive tools, assessment capabilities, and operational guidance for the physical aspects of placement and environmental interactions.

For nearshore placement, detailed monitoring and evaluation of prototype demonstration projects will be combined with physical model evaluation and numerical model improvements to produce well-documented design procedures and predictions of environmental impacts. For offshore placement, research will focus on developing siting and configuration criteria, predicting the performance of various construction techniques including capping, evaluating long-term behavior and integrity, and providing integrated design guidance. Detailed geotechnical laboratory studies, followed by prototype and model verification of capping design methods, will be used to improve cap design procedures and increase capping options. Integration of the nearshore and offshore dredged material placement design aspects into a comprehensive model will facilitate planning, engineering, and operational aspects of dredged material management. Focus area manager is Mr. James Clausner, WES CHL,

clausnj@ex1.wes.army.mil.

2. **Environmental Windows for Dredging Operations** will work to reduce the cost of dredging operations attributable to compliance with environmental windows that are determined to be over-restrictive, inconsistent, or technically unjustified.

Environmental windows are routinely recommended by resource agencies with the intent of protecting sensitive biological resources or their habitats from potential detrimental effects of dredging operations. However, many inconsistencies exist in the application of windows and in the technical bases used to justify windows. Compliance with requests for windows can result in reduced options for contracting dredge plant and equipment, severely constrain mobilization/demobilization schedules, limit contingencies for repairs and severe weather shutdowns, create hazardous working conditions, and ultimately increase dredging project costs.

The environmental windows area will resolve longstanding controversial issues that underlie recommendations for restrictive windows. Investigations will be required to fill gaps in the state of knowledge concerning dredging-related effects of suspended sediments, turbidity, sedimentation, and entrainment on aquatic organisms. Salient results will be published in peer-reviewed literature, and guidance documents on effective operational measures to reduce or eliminate the need for windows will be disseminated. Focus area manager is Dr. Douglas Clarke, WES EL, clarked@ex1.wes.army.mil.

3. **Contaminated Sediment Characterization and Management** will reduce costs and enhance the reliability and acceptability of methods associated with the assessment, dredging, placement, management, and control of contaminated sediments from Corps navigation

projects. The presence of contaminated sediments in many industrial and urbanized harbors and waterways contributes to environmental degradation and inhibits the ability of the Corps to dredge, transport, and relocate sediments in performing its navigation mission. The presence of chlorinated hydrocarbons such as dioxins is especially viewed as a potential threat to the environment and human health, and results in significant project delays and management cost increases. Contaminated sediments unsuitable for conventional disposal may be confined, contained, treated, or simply not dredged.

This research will address high-priority needs aimed at reducing costs associated with screening and assessing potential impacts of contaminants, and increasing the reliability and acceptability of diked confined disposal facilities (CDF) and capping options for management of contaminated sediments. Low-cost, rapid, and interpretable screening methods will be developed to reduce the number and cost of chemical analyses, and identify contaminated material in existing CDFs that can be reused. Contaminant controls, treatment methods, and management techniques arising from the research will emphasize contaminant retention and reduction. Focus area manger is Dr. Michael Palermo, WES EL, palermm1@ex1.wes.army.mil.

4. **Instrumentation for Dredge and Site Monitoring** will implement automated dredge inspection and innovative dredge contract payment methods, characterize and delineate possible contaminated areas of Corps dredging projects, and provide a cost-effective method to accurately monitor cap status with improved timeliness, spatial extent, and reduced effort.

Improvements in instrumented measurements are needed to meet increasingly stringent environmental monitoring requirements and to expand the Corps' automated operational monitoring and bottom characterization

capabilities. DOER will bridge the gap between existing Corps instrumentation needs and the tendency of commercial firms to direct their product development toward broader, nondredging market segments.

Developments from this research will augment commercial products where feasible and will support specialized product applications. Research will help achieve these goals:

(a) monitor contractor pipeline and mechanical dredges, and dump scows;

(b) pay hopper-dredge contracts on a dry-weight basis;

(c) precisely locate dredging, transport, and disposal;

(d) use cable array technology to monitor cap thickness and erosion potential; and

(e) improve dredging site contaminant characterization technology so that more accurate and cost-effective core and bed material sampling plans can be developed to delineate contaminated materials.

Dredge monitoring and data management technology will be incorporated into Corps business practices. Focus area manager is Mr. James Rosati, WES CHL, rosatij@ex1.wes.army.mil.

5. **Demonstration of Innovative Equipment and Process Technologies** will conduct demonstrations of emerging dredging technologies and operations in cooperation with the USACE field operating offices and other resource agencies, and provide documentation of results by video and written reports.

In the past there has not been a programmatic approach to ensure the adequate demonstration, monitoring, evaluation, and reporting of new innovative dredging technology applications as they are identified. This focus area will respond to important targets of opportunity to demonstrate new and innovative equipment and process technologies to potential users.

Innovative dredging equipment and operations developed by domestic and foreign dredging interests will be identified. Technologies with the highest cost savings potential will be evaluated by a review committee composed of USACE operations and maintenance, and research and development, personnel and Corps field representatives. Focus area manager is Mr. Steve Scott, WES CHL, phone scotts@ex1.wes.army.mil.

6. **Ecological Risk Management for Dredging and Disposal Projects** will develop a technically sound approach for characterizing and managing risk that makes use of existing guidance (the dioxin management strategy, and the technical framework) and proven tools for conducting risk-based evaluations of dredged material that are consistent with the U.S. National Academy of Science/U.S. Environmental Protection Agency (EPA) paradigms for risk assessment.

The specter of adverse ecological impacts has become an increasingly important consideration to the dredging manager's decision-making process, and is often an intractable impediment. Ecological impacts most often cited include:

(a) effects of sediment-associated contaminants on aquatic, wetland, and terrestrial organisms;

(b) human consumption of (dioxin-) contaminated fish and shellfish;

(c) turbidity effects on anadromous fish, oysters, etc.

(d) entrainment of valued species (Dungeness crabs, sea turtles, etc.);

(e) habitat destruction/disturbance (nesting shorebirds); and

(f) diminished water quality (high ammonia and low dissolved oxygen).

Existing guidance will be evaluated for incorporation into a broader environmental risk assessment framework. Input will be obtained from experts in the areas of contaminated sediment management and environmental risk assessment. Field demonstrations of risk-based tools and newly developed methods will be conducted to verify their utility for assisting the dredging manager in making difficult, cost-effective decisions on controversial projects. Residue-effects data and trophic transfer models will be enhanced to facilitate risk-based assessments, and will lead to risk management where incremental reductions in risk for a range of actions/alternatives can be evaluated in terms of dollars expended. Focus area manager is Dr. David Moore, WES EL, moored3@ex1.wes.army.mil.

Benefits of the DOER Program

Benefits will include cost-effective practices for dredging and dredged material disposal; environmental protection enhancement through application of effective environmental windows; compliance with environmental statutes for identifying and managing contaminated sediments; reduction of costs of disposal of dredged material by beneficial placement in the nearshore zone; greater flexibility in dredging in sensitive ecological areas; and expanded options for beneficial uses of contaminated and noncontaminated dredged materials. This research is being conducted with full

coordination and cooperation of other appropriate agencies, including the EPA, the U.S. National Marine Fisheries Service, and the U.S. Fish and Wildlife Service. The DOER Program includes an aggressive technology transfer mechanism to ensure rapid implementation of research products into Corps projects.

Discussion

(There was no discussion.)

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